

CLAIMS:

1. A complex catalyst for asymmetric epoxidation of enones, which comprises:

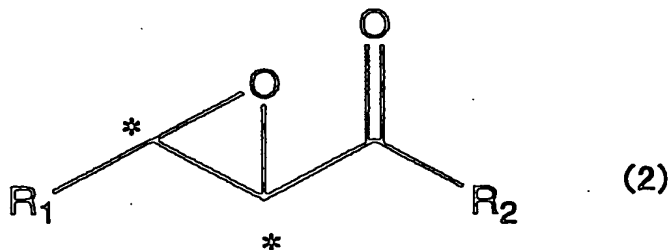
- (A) an optically active binaphthol,
- 5 (B) lanthanum triisopropoxide,
- (C) triphenylphosphine oxide, and
- (D) cumene hydroperoxide or tert-butyl hydroperoxide.

2. A catalyst solution for asymmetric epoxidation of enones, which contains a complex catalyst as defined in
10 Claim 1 and which shows a yellowish green to deep green color.

3. A catalyst for asymmetric epoxidation of enones, which comprises:

- (A) an optically active binaphthol,
- 15 (B) lanthanum triisopropoxide, and
- (c) tri(4-fluorophenyl)phosphine oxide, tri(4-chlorophenyl)phosphine oxide or tri(4-trifluoromethylphenyl)phosphine oxide.

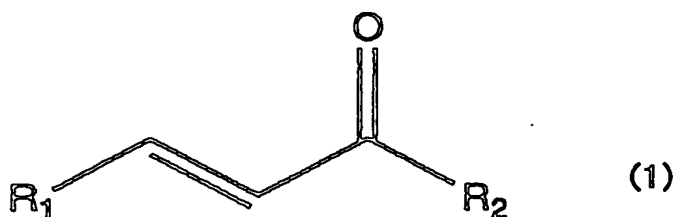
4. A process for producing an optically active epoxide
20 of the following formula (2):



25 wherein each of R₁ and R₂ which are independent of each other, is a C₁₋₂₀ linear, branched or cyclic alkyl group,

an aromatic group, an aromatic group substituted by from
1 to 5 C₁₋₅ alkyl groups, an aromatic group substituted by
from 1 to 5 C₁₋₅ alkoxy groups, an aromatic group
substituted by from 1 to 5 halogen atoms, a C₁₋₅ linear,
5 branched or cyclic alkyl group substituted by an aromatic
group, or a C₁₋₅ linear, branched or cyclic alkyl group
substituted by a halogenated aromatic group, and symbol *
represents optically active carbon, which comprises
reacting an enone of the following formula (1):

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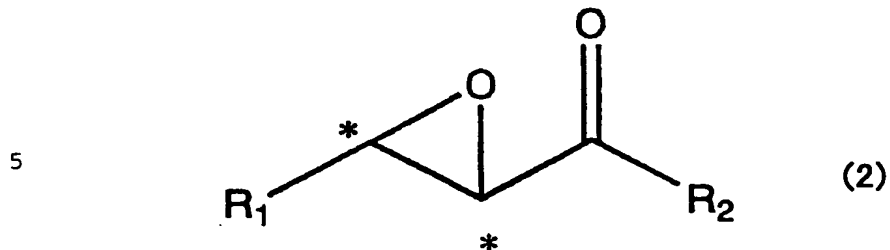


15 wherein R₁ and R₂ are as defined above, with an oxidizing
agent in the presence of a catalyst as defined in Claim 1
or 2.

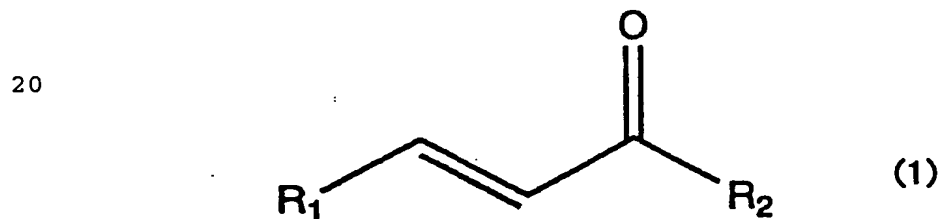
5. The process for producing an optically active
epoxide according to Claim 4, wherein the reaction is
20 carried out by adding the enone to a catalyst solution as
defined in Claim 2 and then supplying cumene
hydroperoxide or tert-butyl hydroperoxide thereto.

6. The process for producing an optically active epoxide
according to Claim 4, wherein the reaction is carried out
25 by supplying a mixture comprising the enone and cumene
hydroperoxide or tert-butyl hydroperoxide to a catalyst
solution as defined in Claim 2.

7. A process for producing an optically active epoxide of the following formula (2):



wherein each of R_1 and R_2 which are independent of each other, is a C_{1-20} linear, branched or cyclic alkyl group, an aromatic group, an aromatic group substituted by from 1 to 5 C_{1-5} alkyl groups, an aromatic group substituted by from 1 to 5 C_{1-5} alkoxy groups, an aromatic group substituted by from 1 to 5 halogen atoms, a C_{1-5} linear, branched or cyclic alkyl group substituted by an aromatic group, or a C_{1-5} linear, branched or cyclic alkyl group substituted by a halogenated aromatic group, and symbol * represents optically active carbon, which comprises reacting an enone of the following formula (1):



wherein R_1 and R_2 are as defined above, with an oxidizing agent in the presence of a catalyst as defined in Claim 3.